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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/849,022

05/20/2004

Hiroyasu Kiba

500.43870X00

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24956

7590

08/24/2006

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
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EXAMINER

GOLDEN, JAMES R

ART UNIT

PAPER NUMBER

2187

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/849,022

Applicant(s)

KIBA ET AL.

Examiner

James Golden

Art Unit

2187

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,6,8,10 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6,8,10 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The instant application 10/849022 has a total of 7 claims pending. Claims 4 and 9 have been canceled. There are 3 independent claims and 4 dependent claims.

Drawings

1. The corrections to the drawings received 05/10/2006 are accepted, and the objection is withdrawn.

Specification

2. The corrections to the title, abstract and disclosure received 05/10/2006 are accepted, and the objections are withdrawn.

Claim Objections

3. The corrections to the claims received 05/10/2006 are accepted, and the objections are withdrawn.

Claim Rejections - 35 USC § 112

4. The corrections to the claims received 05/10/2006 are accepted, and the rejections under 35 USC § 112 are withdrawn.

Claim Rejections - 35 USC § 101

5. The corrections to the claims received 05/10/2006 are accepted, and the rejections under 35 USC § 101 are withdrawn.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1, 3, 5-6, 8 and 10-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (US 2002/0178336) in view of Banks (US 6,202,079) and Shimada (US 2003/0221062).
8. **With respect to claims 1 and 6**, Fujimoto et al. disclose a cache control method in a data processing system (claim 1) and a data processing system (claim 6) having
- a computer for executing a program (one of numerous CPUs internal to storage control unit 1a of Fig. 1; paragraph 0044), and
 - a storage unit (1 of Fig. 1; paragraph 0039) having
 - a cache memory (11 of Fig. 1; paragraph 0053, lines 1-2) for storing data transmitted as a result of execution of said program (paragraph 0053, lines 2-7),

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- a cache controller (1a of Fig. 1; paragraph 0039, lines 3-5; paragraph 0042) having a cache management table (50 of Fig. 3; paragraph 0052), and
 - a disk device having memory medium for storing data stored in said memory (12 of Fig. 1; paragraph 0039, line 6; paragraph 0041),
- wherein said computer
 - makes and sends a write request, in a write-through mode, thereby to update data of the program unreflected upon said disk device (paragraph 0053, lines 1-7; paragraph 0054, lines 1-4),
 - issues a flush command to said storage unit in order to reflect a page (equivalent to segment of paragraph 0053, lines 1-2) being on said cache memory unreflected upon said memory medium, onto said memory medium (paragraph 0053, lines 7-12), and
- wherein said cache controller of storage unit (1a of Fig. 1), responding to said flush command from said computer, if a mode in said cache management table corresponding to a page for said flush command coincides with write-after (write to disk is asynchronous, paragraph 0053, lines 7-12), writes the page indicated by a cache pointer (segment number 51 of Fig. 3; paragraph 0052, lines 1-4) for the page in said cache management table to said memory medium and changes cache management entry in said cache management table to a state of reflected (paragraph 0054, lines 4-7),

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- wherein said cache controller of said storage unit, responding to said write request if a mode designated during said write request is write-after, writes data in said cache memory (write to disk is asynchronous, paragraph 0053, lines 7-12), and changes said cache management entry for the page to a state of unreflected (paragraph 0054, lines 7-8).

Fujimoto et al. do not disclose the limitations

- wherein said computer
 - makes and sends a write-request, in the write-through mode, to said storage unit for requesting write of a synchronous point journal which records, in the storage unit, completion of a synchronous point process until a check point from said computer to said storage unit, and
- wherein said cache controller of said storage unit, responding to said write request, if said mode designated during said write request is not write-after, writes the page to both said cache memory and said memory medium, thereafter changes said cache management entry for the page to the state reflected.

However, Banks discloses the limitation

- wherein said computer
 - makes and sends a write-request, in the write-through mode, to said storage unit for requesting write of a synchronous point journal which records, in the storage unit, completion of a synchronous point process until a check point from said computer to said storage unit (column 2, lines 31-43).

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Additionally, Shimada discloses the limitation

- wherein said cache controller of said storage unit, responding to said write request, if said mode designated during said write request is not write-after, writes the page to both said cache memory and said memory medium (paragraphs 0192-193).

Fujimoto et al. discloses the further limitation wherein thereafter changes said cache management entry for the page to the state reflected (paragraph 0054, lines 4-7).

Fujimoto et al., Banks and Shimada are analogous art because they are from the same field of endeavor, namely data backup.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the synchronous log of Banks and the write-back operation of Shimada with the cache memory management system of Fujimoto et al. The motivation for combining the synchronous log would have been to "allow the same protocol to be restarted in the case of a failure of the node" (Banks, column 2, lines 37-38), and the motivation for combining the write-back operation would have been so that "inconsistency of modifying the same data by another input/output channel after that can be avoided" (Shimada, paragraph 0194).

Therefore, it would have been obvious to a person of ordinary skill in the art to combine Banks and Shimada with Fujimoto et al. for the benefit of a cache memory management system with a write-back mode and a checkpoint log to obtain the invention as specified in claims 1 and 6.

9. **With respect to claims 3 and 8**, Fujimoto et al. in view of Banks and Shimada disclose the cache control method according to claim 1 and the data processing system according to claim 6 (see above paragraph 8). Fujimoto et al. further disclose the limitations wherein

- each of said write request and said flush command includes area identification information for specifying areas in said cache memory (paragraph 0052, lines 1-4 describe a cache segment number, which is equivalent to area identification information; paragraph 0053, lines 2-7 describe how segments are stored; paragraph 0054, lines 1-4 describe how segments are flushed to disk), and
- wherein when said write request is inputted, said transmitted data is stored in an area specified by the area identification information of said write request (paragraph 0053, lines 2-7) and
- when said flush command is inputted, the data stored in the area specified by the area identification information of said write request is stored in said disk device (paragraph 0054, lines 1-4).

10. **With respect to claims 5 and 10**, Fujimoto et al., Banks, Shimada and Kano et al. disclose the cache control method according to claim 3 and the data processing system according to claim 8 (see above paragraph 7). Fujimoto et al. further disclose the limitations wherein the area identification information of said cache memory includes volume identification and segment identification information (paragraph 0052, lines 1-4; the segment number includes volume identification, because there is only one volume).

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11. **With respect to claim 11**, Fujimoto et al. disclose a computer-readable medium having stored thereon a data processing program for functioning a data processing system (paragraph 0044, lines 4-8) having

- a computer which executes said data processing program (one of numerous CPUs internal to storage control unit 1a of Fig. 1; paragraph 0044), and
- a storage unit (1 of Fig. 1; paragraph 0039) having
 - a cache memory (11 of Fig. 1; paragraph 0053, lines 1-2) for storing data transmitted as a result of execution of said program (paragraph 0053, lines 2-7),
 - a cache controller (1a of Fig. 1; paragraph 0039, lines 3-5; paragraph 0042) having a cache management table (50 of Fig. 3; paragraph 0052), and
 - a disk device having memory medium for storing data stored in said memory (12 of Fig. 1; paragraph 0039, line 6; paragraph 0041),
- wherein said data processing program when executed causes the steps to be performed of:
- in said computer
 - making and sending a write request, in a write-through mode, thereby to update data of the program unreflected upon said disk device (paragraph 0053, lines 1-7; paragraph 0054, lines 1-4),
 - issuing a flush command to said storage unit in order to reflect a page (equivalent to segment of paragraph 0053, lines 1-2) being on said cache

memory unreflected upon said memory medium, onto said memory medium (paragraph 0053, lines 7-12), and

- in said cache controller of storage unit (1a of Fig. 1), responding to said flush command from said computer, if a mode in said cache management table corresponding to a page for said flush command coincides with write-after (write to disk is asynchronous, paragraph 0053, lines 7-12), writes the page indicated by a cache pointer (segment number 51 of Fig. 3; paragraph 0052, lines 1-4) for the page in said cache management table to said memory medium and changes cache management entry in said cache management table to a state of reflected (paragraph 0054, lines 4-7),
- in said cache controller of said storage unit, responding to said write request if a mode designated during said write request is write-after, writes data in said cache memory (write to disk is asynchronous, paragraph 0053, lines 7-12), and changes said cache management entry for the page to a state of unreflected (paragraph 0054, lines 7-8).

Fujimoto et al. do not disclose the limitations

- in said computer
 - making and sending a write-request, in the write-through mode, to said storage unit for requesting write of a synchronous point journal which records, in the storage unit, completion of a synchronous point process until a check point from said computer to said storage unit, and

- in said cache controller of said storage unit, responding to said write request, if said mode designated during said write request is not write-after, writes the page to both said cache memory and said memory medium, thereafter changes said cache management entry for the page to the state reflected.

However, Banks discloses the limitation

- wherein said computer makes and sends a write-request, in the write-through mode, to said storage unit for requesting write of a synchronous point journal which records, in the storage unit, completion of a synchronous point process until a check point from said computer to said storage unit (column 2, lines 31-43).

Additionally, Shimada discloses the limitation

- in said cache controller of said storage unit, responding to said write request, if said mode designated during said write request is not write-after, writes the page to both said cache memory and said memory medium (paragraphs 0192-193).

Fujimoto et al. discloses the further limitation wherein thereafter changes said cache management entry for the page to the state reflected (paragraph 0054, lines 4-7).

Response to Arguments

12. Applicant's arguments with respect to claims 1, 3, 5, 6, 8, 10 and 11 have been considered but are moot in view of the new grounds of rejection.

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Negishi et al. (US 2005/0021657) teaches a cache management system with a cache management table that stores the reflected status.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Golden whose telephone number is 571-272-5628. The examiner can normally be reached on Monday-Friday, 8:30 AM - 5:30 PM.

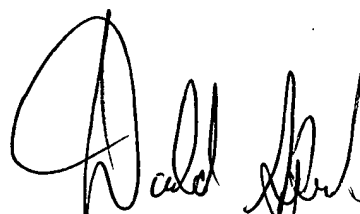
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 571-272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

James R. Golden
Patent Examiner
Art Unit 2187

August 10, 2006



DONALD SPARKS
SUPERVISORY PATENT EXAMINER